

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 June 2002 (13.06.2002)

PCT

(10) International Publication Number
WO 02/46822 A1

(51) International Patent Classification⁷: **G02B 23/04**,
F41G 1/38

CH, CN, CO, CR, CU, CZ, CZ (utility model), DE, DE (utility model), DK, DK (utility model), DM, DZ, EC, EE, EE (utility model), ES, FI, FI (utility model), GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(21) International Application Number: PCT/SE01/02697

(22) International Filing Date: 6 December 2001 (06.12.2001)

(25) Filing Language: Swedish

(26) Publication Language: English

(30) Priority Data:
0004499-0 6 December 2000 (06.12.2000) SE

(71) Applicant and

(72) Inventor: LYDÉN, Åke [SE/SE]; Offervägen 1, S-746 38 Bålsta (SE).

(74) Agents: BERGLUND, Stefan et al.; Bjerkéns Patentbyra KB, Östermalmsgatan 58, S-114 50 Stockholm (SE).

(81) Designated States (national): AE, AG, AL, AM, AT, AT (utility model), AU, AZ, BA, BB, BG, BR, BY, BZ, CA,

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

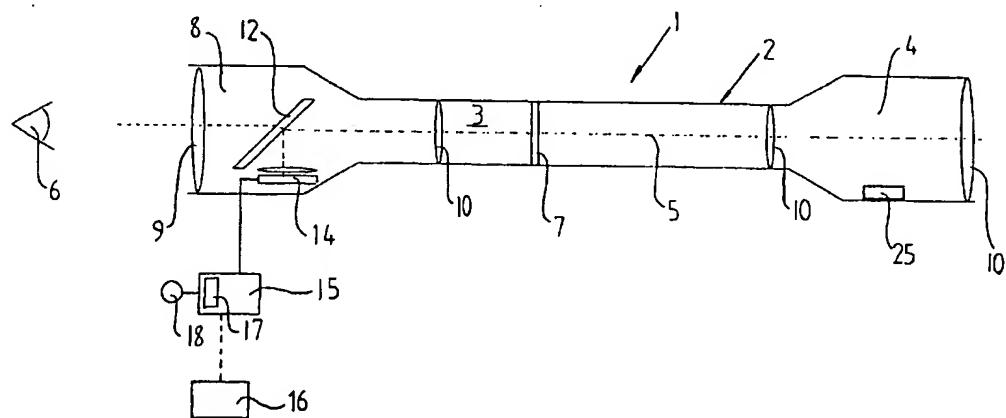
— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A DEVICE FOR VIEWING OBJECTS AT A DISTANCE FROM A USER OF THE DEVICE



WO 02/46822 A1



(57) Abstract: The invention refers to a device for aiming objects at a distance from a user of the device, including a first part (4) arranged to receive a bundle of light beams along an aiming line (5), which form an optical image of the viewed object, a reflecting member (12) provided to be hit by said bundle from the first part (4) and to reflect at least a primary part of the light of said bundle, and a second part (8), which includes an ocular member (9) enabling to a user to view the object along the aiming line (5). The device includes an electronic image-receiving member (14), which is arranged to receive said reflected part and convert it to an electric signal and which image-receiving member (14) is connectable to an electronic image-processing unit (15), which includes a memory member (17) arranged to store said electric signal in an electronic manner.

5

A device for viewing objects at a distance from a user of the device

10 THE BACKGROUND OF THE INVENTION AND PRIOR ART

The present invention refers to a device for viewing objects at a distance from a user of the device, including a first part arranged to receive a bundle of light beams along an aiming line, which form an optical image of the viewed object, a reflecting member provided to be hit by said bundle from the first part and to reflect at least a primary part of the light of said bundle, and a second part, which includes an ocular member enabling to the user to view the object along the aiming line.

20 The device according to the invention may be utilised wherever there is a need to aim at anything, i.e. to view any remote object. The device may advantageously be applied to several types of instruments, especially those which are intended to be directed towards a certain target.

An area of application where the invention advantageously may be used is different types of weapons, which are fired towards a target. The invention may advantageously be utilised during use of all 30 types of such weapons, for instance hunting guns, police weapons, military fire arms and larger weapons, such as anti-aircraft guns, shell guns, artillery guns etc., weapons for sport exercising etc.

35 However, the field of the invention does not need to include only different types of weapons. The device may in an advantageous manner be applied to different types of binoculars and similar

viewing devices for different purposes, for instance for monitoring or for bird watching.

- 5 A further field of application, where the device according to the invention may be used in an advantageous manner is for instance instruments for sound and light transmission and/or receiving, which need to be directed, such as laser instruments for instance for measuring the velocity of vehicle traffic.
- 10 It is known to arrange reflecting members, which when they are hit by a bundle of light beams divide the light into two portions. One such reflecting member is known from the document GB 1 418 539, which discloses a semi-transparent mirror arranged in a telescopic sight. By such a semi-transparent mirror, the incoming light is divided into two portions, one which continues to an ocular of the telescopic sight and one which is angled 90° out from the telescopic sight through a lens and a lateral opening. Furthermore, the known telescopic sight includes means for holding a conventional camera outside this opening, and thus, images may be taken of the object 15 viewed through the telescopic sight. This known telescopic sight is intended for a fire-arms and to be connected with a conventional, external camera, especially a camera having fixed lenses.
- 20 A disadvantage of the known telescopic sight is that it may not replay the images stored by the camera and certainly not replay a sequence of images, for instance in connection with the firing of a shot.
- 25
- 30 SUMMARY OF THE INVENTION
- The object of the present invention is to provide a device, by which remote objects may be viewed and which enables storing and replay of the image which a user of the device sees when he views the object. Furthermore, it is aimed at a device which may replay a 35 sequence of images of the object that the user views through the device.

- This object is obtained by a device of the kind initially defined, which is characterised in that it includes an electronic image-receiving member, which is arranged to receive said reflected primary part and to convert it to an electric signal and which image-receiving member is connectable to an electronic image-processing unit, which includes a memory member arranged to store in an electric manner said electric signal. By such a device, it is possible to receive and store the image seen by the user, when he views an object along the aiming line in connection with any activity. If the device, for instance, is applied to a weapon, such an activity may be the firing of a shot. The device according to the invention then enable storing of an image sequence, which shows the point towards which the weapon has been directed before the shot was fired, at which point the shot hits and the course of events after the shot did hit. Such a sequence of images may be used for a plurality of different purposes, for instance for education of shots, for adjustment of the weapon, for documentation of a shooting, for instance in connection with actions of the police or military etc.
- According to a preferred embodiment of the invention, the reflecting member is semi-transparent for permitting a secondary part of the light of said bundle from the first part to extend further through the reflecting member to the eye of the user. By means of this embodiment the light is divided into two paths, which both describe the image the user views. The device is arranged to transfer one of these to the ocular member and the other to the image-receiving member. It is thus possible to store the image the user momentarily sees through the ocular member. The part of the light which extends to the ocular member may extend in a path along the aiming line. However, this path does not need to coincide with the aiming line but may be parallel with the aiming line or form an angle therewith.
- According to a further embodiment of the invention, the image-processing unit is arranged to convert said electric signal to an electronic image. Furthermore, the device includes advantageously a display member, which is connected to the image-processing unit

- and is arranged to visualise said electronic image. Therethrough it is possible for the user to see the image transferred by the light along the aiming line via the display member. If the device according to the invention is applied to a weapon, the user may
- 5 visually receive information about his hit pattern on the display member. This will be appreciated among sport shots, who may obtain a high skill level thanks to the invention enabling for a user to view an analyse the incorrectness between the point aimed at and the point of impact. This leads to the requirement of a relatively
- 10 small number of shots for permitting a user to obtain a certain skill level and consequently, the costs for ammunition and littering thereof in the environment are reduced.
- According to a further embodiment of the invention, the image-processing unit may be arranged to store a plurality of electronic images sequentially in the memory member, and the display member is arranged to permit replay of a sequence of images of said store images. Thanks to the fact that the memory member stores the image sequence which the user sees electronically,
- 15 possibilities are created for transferring in a wireless manner a sequence of images to an external visualising unit. This is very advantageous since other persons then may view the image seen by the user. For instance, at a competition in biathlon, the device may be applied to a sports gun, wherein the device according to the
- 20 invention makes it possible for the spectators to follow the viewing image of the user at the shooting moments. In such a case, the spectators may in a more significant manner experience the excitement of such an event, which increases the commercial value of the sport.
- 25
- 30 According to a further embodiment of the invention, the device includes a sensor member, which is arranged to sense the value of one or several parameters and to co-operate with the image-processing unit, which is arranged to provide the user with information regarding said parameters via the display member. One example of such a parameter is the distance to the object viewed. Consequently, the user may in an easy manner see the information
- 35

and take it into consideration, which is advantageous for instance in connection with shooting.

- According to a further embodiment of the invention, the reflecting member includes two reflecting surfaces, a first surface of which is intended to reflect said bundle of light beams from the first part to the image-receiving member and a second surface of which is intended to reflect the electronic image visualised by the display member to the eye of the user. Consequently, the user may view the object virtually in real time at the same time as the image-receiving member stores electronic images of the object viewed by the user. This creates possibilities for the image-processing unit to compare the information from the images with the information from a database, for instance for automatic identification of the object viewed, as for instance, vehicle registration numbers.

- According to a further embodiment of the invention, the reflecting member is adjustable in at least two positions, wherein a first position permits the user to view directly the object along the aiming line and a second position permits the user to view the object virtually along the aiming line via the display member. By such an adjustability, the user may use the optic of the device as a sight, and view the object independent of the electronics in the image receiving device and the image-processing unit.

- According to a further embodiment of the invention, the device includes a member for preferably automatic initiating and/or terminating of said storing. By such a member, possibilities are created for automatic alternation between start and stop of said storing. This makes it possible to a user to act actively in connection with any activity without the need of considering whether the storing is activated or not.

- According to a further embodiment of the invention, said member is arranged to co-operate with a trigger of a triggering device in such a way that an initiated change of position of said trigger activates said storing prior to an firing. Consequently, an image sequence,

- which describes the course of events, which the user sees via the device before, during and/or after the firing, may be documented. This is very advantageous, for instance, in connection with actions of the police, which may require shooting for self-defence, since the
- 5 device enables replay of stored sequences of images. This may for instance be of a significant importance for proving any crime.

BRIEF DESCRIPTION OF THE DRAWINGS

10 The present invention is now to be explained more closely by means of different examples of embodiments and with reference to the drawings attached.

15 Fig 1 discloses schematically a side view of a first embodiment of the device according to the invention with portions thereof cut away.

Fig 2 discloses schematically a side view of a second embodiment of the device according to the invention with portions thereof cut away.

20 Fig 3 discloses schematically a side view of a third embodiment of the device according to the invention with portions thereof cut away.

25 Fig 4 discloses schematically a side view of a fourth embodiment of the device according to the invention with portions thereof cut away.

Fig 5 discloses schematically a side view of a fifth embodiment of the device according to the invention with portions thereof cut away.

30 Fig 6 discloses schematically a side view of the device according to the invention, when it is applied to a firing device.

DETAILED DESCRIPTION OF DIFFERENT EMBODIMENTS OF THE INVENTION

35 Although the device according to the invention for viewing or enabling aiming at an object is applicable to any devices which

need to be directed toward a target and permit storing for enabling replay of the aimed target, the invention will in the following be described for exemplifying purposes when it is used as a telescopic sight 1.

- 5 Fig 1 discloses a side view of a first embodiment of a device according to the invention, which includes a substantially elongated house 2, which may have a substantially tubular configuration with for instance a circular or polygonal cross-section. The house 2 is
- 10 made in a rigid material, which surrounds an inner space 3. This space 3 may include different types of optical elements 10, such as lenses, which gives an enlarged image of remote objects viewed by the user. A first part 4 of the house 2 includes a first light transparent opening, which is arranged to receive a bundle of light
- 15 beams along a substantially straight aiming line 5. This aiming line 5 extends substantially between an eye 6 of a user of the device and a point at an arbitrary object viewed by the user. The device includes an aiming means 7, which has a point arranged to be located at the aiming line 5 so that the latter let the eye 6, the
- 20 aiming means 7 and the viewing point coincide. The aiming means 7 may be formed by a hair lines, a light point or the like. The aiming means 7 may be projected into the image the user sees as an electronically generated aiming means. A second part 8 of the house 2 includes a second light transparent opening, which
- 25 includes an ocular member 9. This is provided to be hit by said bundle of light beams, which arise from the first part 4 of the house 2 along the aiming line 5. Such an incoming bundle of light beams forms an optical image of the object viewed. This makes it possible for the user to see the viewed object along the aiming line 5. The
- 30 ocular member 9 may be constructed in different ways with several lens systems. The device may be provided with replaceable ocular members so that the enlarging may be changed, and/or with zoom ocular members with variable enlarging capability.
- 35 Furthermore, the device includes a reflecting member 12, which is provided to be hit by said light beams. The reflecting member 12 is semi-transparent in order to divide the light of said bundle of beams

in two parts. This division is obtained by arranging the semi-transparent reflecting member 12 to reflect a primary part of the light and to let a secondary part of the light through so that the latter is transmitted further substantially along the aiming line 5.

5 Both these parts of the light transfer the image which the user views along the aiming line 5. As appears from Fig 1, the transmitted part reaches the eye 6 of the user via the ocular member. It is to be noted that the light path between the reflecting member 12 and the ocular member 9 may be parallel but more or less displaced from

10 the aiming line 5 between the reflecting member 12 and said point at the object viewed. The reflected part of the reflecting member 12 is directed to an electronic part of the device for storing of the image viewed by the user.

15 The device according to the invention includes an electronic image-receiving member 14, which is arranged to receive said reflected part of the light. The image-receiving member 14 is provided outside said aiming line, for instance in connection to an inner wall portion of the second part 8 of the house 2. The image-receiving member 14 is arranged to sense this light and the transferred image thereof in such a way that the image-receiving member 14 represents the motive or image and converts it to an electric signal. The electric signal, for instance a video signal, represents the image which the user views by means of the device. The image-receiving member 14 has a surface area, which faces the reflecting member 12. This surface area includes a type of one or several sensors. One such sensor type is for instance a semi-conductor component with a light sensitive surface which has a plurality of closely located image elements, so-called pixels. Preferably, the

20 image-receiving member 14 includes a CCD-sensor (charge-coupled device), a CMOS-sensor (Complementary Metal-Oxide Semi-conductor) or any similar sensor for converting the optical image to an electric signal. This sensor has a surface with light sensitive image elements, which give electric charges when they

25 are hit by light. Furthermore, the sensor includes circuits, which are arranged to handle these charges and to feed them as an electric signal for transferring of images.

30

35

Furthermore, the device according to the invention includes an image-processing unit 15 by which the image-receiving member 14 is provided to be connectable for electronic transfer. This transfer is obtained in a manner known per se by means of an optical or electric cable, which is releasably connected to the image-receiving member 14 and the image-processing unit 15. Alternatively, this transfer may be wireless, for instance radio waves, microwaves, bluetooth, IR or the like. The image-processing unit 15 includes a memory member 17 arranged to store in an electronic manner the electric signal from the image-receiving member 14. In addition, the image-processing unit 15 is arranged to convert the electric signal to an electronic image, which is a representation in an electronic form of the image, which is transferred by the light and which the user views. Furthermore, the image-processing unit 15 is arranged to store a plurality of such electronic images sequentially in the memory member 17. The image-processing unit 15 may be an integrated part of the device but may also be provided beside the device, such as a stationary unit. Furthermore, the image-processing unit 15 may be provided in or outside said house 2, for instance if the device is applied to a gun, on a butt of the gun.

The device according to the invention includes a display member 16, which is connectable to the image-processing unit 15. The display member 16 is arranged to visualise the electronic image and may be mounted as an integrated part in the device, see Figs 3-5. The display member 16 may also be realised by an external screen, for instance of a computer, see figs 1 and 2. Hereby, the user may after having viewed an object show other persons the images he has seen in connection with the viewing thanks to the fact that the device is arranged to permit replay of the electronic image afterwards. Since the device according to the invention enables storing of a plurality of viewed images, the display member 16 is arranged to permit replay of one or several image sequences thereof. In addition to the viewed image, the display member 16 also discloses the aiming means 7.

- The device includes a sensor member 25, which is arranged to sense the value of one or several parameters, for instance the distance to an object viewed by the user. The device may also include sensor members for sensing the existing wind conditions.
- 5 The sensor member 25 is intended to co-operate with the image-processing unit 15 by providing the user with information regarding said parameters via the display member 16. Said parameters may also be utilised for controlling the display member 16 and/or the aiming means 7.
- 10 Fig 2 discloses a side view of a second embodiment of the device according to the invention. Elements, which correspond to those in the first embodiment, illustrated in Fig 1, have been given the same reference signs. The second embodiment differs from the first in
- 15 that the image-receiving member 14 is provided to be releasably connected to the device. Preferably, the image-receiving member 14 is provided in a casing 19, which is releasably connected to said house.
- 20 Fig 3 discloses a third embodiment of the device according to the invention. This embodiment differs from those previously described in that the reflecting member 12 has two parts 22, 32. These two parts 22, 32 are arranged to reflect all light, which hits them, such as a mirror. A first 22 of these parts 22, 32 reflects incoming light
- 25 from the first part 4 of the house 2 to the image-receiving member 14. The optical image transferred by the light is transferred from the image-receiving member 14 via the image-processing unit 15 to an electronic image, which is presented by the display member 16. The display member 16 is in this embodiment provided substantially
- 30 opposite to the image-receiving member 14 as appears from Fig 3, which is not necessary. The electronic image is visualised on a surface area of the display member 16, which faces the second part 32 of the reflecting member 12. When the user views the object in question along said aiming line 5, he will see the image that is
- 35 presented by the display member 16 since the second part 32 of the reflecting member 12 reflects it to the eye 6 of the user. Therethrough, it is possible for the user to view an arbitrary object

- presented in the form of an electronic image via the display member 16. The display member 16 is arranged to display each image transferred by the light to the image-receiving member 14, wherein the electronic image is continuously updated so that the user may
- 5 view the object in real time via the display member 16. The reflecting member 12 may according to the third embodiment of course be designed as a single plate with two opposite reflecting surfaces.
- 10 Fig 4 discloses a fourth embodiment of a device according to the invention. This embodiment differs from those previously described in that the reflecting member 12 is an integrated part with two opposite surfaces 11, 13, which reflect all light received by these sides, such as a double sided mirror. A first 11 of these two
- 15 reflecting surfaces 11, 13 is intended to reflect all light from the first part 4 of the house 2 to the image-receiving member 14. The second surface 13 of the two is intended to reflect the electronic image visualised by the display member 16 to the eye 6 of the user. The reflecting member 12 is adjustable into at least two positions
- 20 12a, 12b, wherein a first position 12a permits the user to view the object directly along the aiming line 5 and a second position 12b permits the user to view the object virtually along the aiming line 5 via the display member 16. Said adjustability of the reflecting member 12 may for instance be obtained by means of a rotatable
- 25 joint 40. As appears from Fig 4, the image-processing member 15 may advantageously be provided within the house 2.
- Fig 5 discloses a fifth embodiment with a reflecting member 12 where the two opposite surfaces are not parallel but form an angle to each other. Furthermore, the image-receiving member 14 and the display member 16 are inclined in relation to the aiming line 5 and displaced in relation to each other.
- 30
- 35 The invention may advantageously be applied to a weapon and will therefore also be described by way of examples in such a connection.

Fig 6 discloses a device according to the invention applied to a firing device in the form of a gun 20. As appears from Fig 5, the image-receiving member 14 is provided in connection to the reflecting member 12 in order to receive the reflected part of the light. The device includes electronic members, which in this example are provided on or in a butt of the gun 20. These are the image-processing unit 15 which permits storing and processing of the electric signals, the display member 16 for visualising the electronic images thereof, a connection member 27 for permitting information transfer to an external equipment, and a current source 28 such as a battery. These are provided in electric connection to each other 15, 16, 27, 28 and the image-receiving member 14.

The device includes a member 18 intended to control the electronic storing of the images, which the user views, i.e. when the storing is to be initiated and terminated, respectively. A member 18 is arranged to permit automatic or manual manoeuvring of the storing process. For instance, the storing may be initiated automatically in case of an envelope movement, when a shot has been fired, due to any other sound, the impact which arises, or in connection with any other event which occurs during firing. Also terminating of the storing may take place automatically, for instance a pre-determined time after a shot. It is also possible to let the storing of images occur continuously and to terminate the storing, for instance automatically a pre-determined time period after firing of a shot. The member 14 may advantageously also be arranged to co-operate with a trigger 30 of the gun 20, for instance for achieving a triggering function which is synchronised with the firing of the gun. The device may be arranged in such a way that the storing is activated when the trigger 30 is moved from a starting position. This may be provided in such a way that an initiated change of position of the trigger 30 from its starting position activates the storing prior to the firing. In the same way, the device may be arranged in such a way that the storing is terminated when the trigger 30 again reaches its starting position. This may be obtained by the fact that said member 18 also includes means for connection to the trigger 30 for sensing its position in such a way that the storing occurs during a

- time interval covering the whole firing event. A first part of this time interval stores the image which the user views before any firing has occurred. A second part of this time interval stores the firing event proper. A third part of this time interval stores the image which the user views after the firing has taken place. The memory member 17 is advantageously arranged to enable storing of several separate image sequences, for instance one image sequence for each shot, which is present in the ammunition magazine of the weapon.
- 5 10 A further embodiment of the invention is a weapon system, which includes a weapon with a trigger for firing towards a target and a telescopic sight for directing the weapon towards the target. This weapon system includes an electronic device, which is arranged to receive and store in an electronic manner an image sequence,
- 15 which a user sees in said telescopic sight in connection with the firing. This in order to enable evaluation of the aiming point of the weapon in connection with the firing as well as which point of impact is obtained thereby. The electronic device of the weapon system is arranged to co-operate with the weapon and the
- 20 20 telescopic sight in such a way that an initiated change of position of the trigger activates said storing prior to the firing.
- Such a weapon system creates the basis for a plurality of possibilities. For instance, the aiming means, such as a hair lines
- 25 25 may be arranged to be automatically adjustable depending on the control parameters, which the device calculates by means of information, such as distance and wind conditions, provided from sensors of the weapon system. According to an additional further development of such a weapon system, it may be arranged to
- 30 30 enable interactive use. By interactive use is here meant a computer supported dialogue in any form to take place between the user and the weapon system.
- It is noted that the embodiments described and illustrated in the
- 35 35 drawings are to be regarded as examples. The invention may thus be realised in other manners with maintaining of the basic inventive thought. Especially, it is noted that persons skilled in this field, after

having received knowledge about the solution according to the invention, of course are capable of performing different modifications of the embodiments exemplified without leaving the scope of patent protection. The reflecting member 12, the image-receiving member 14 and the display member 16 do not need to be provided in a rear part of the device but may be located in the forward part of a telescopic sight.

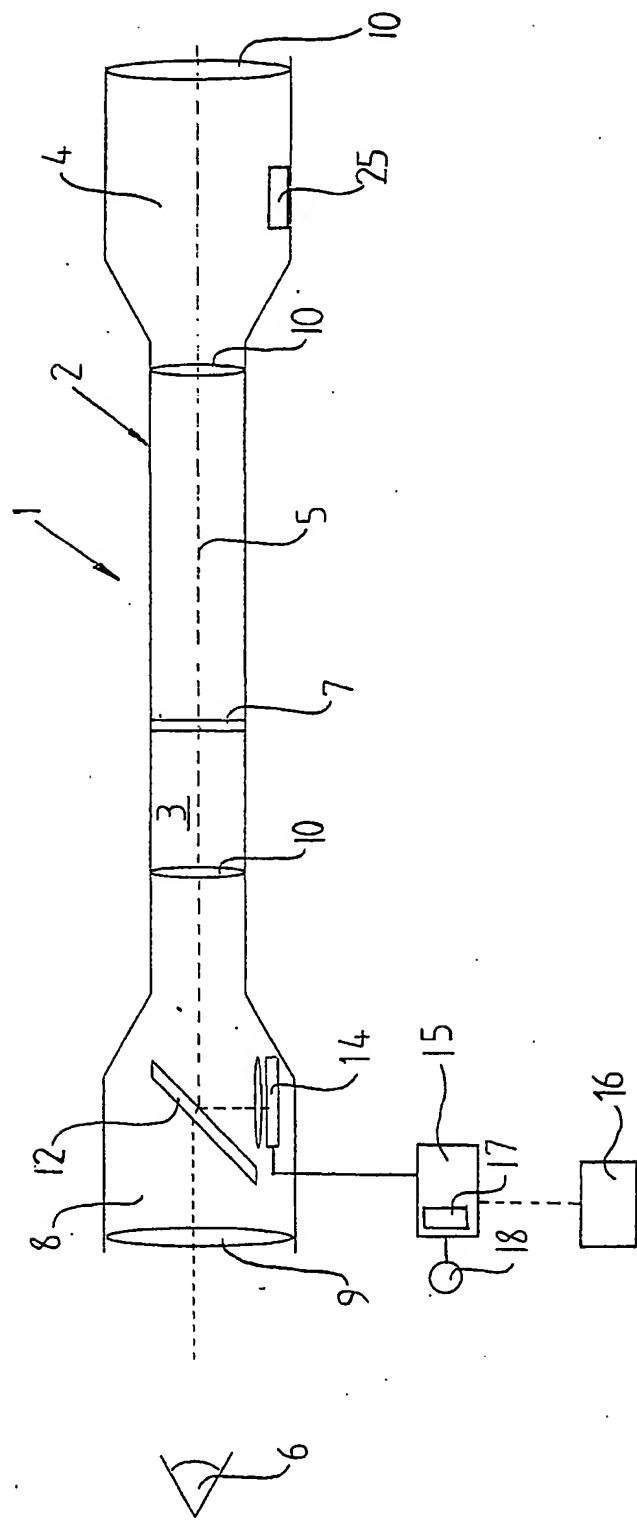
Claims

1. A device for viewing objects at a distance from a user of the device, including a first part (4) arranged to receive a bundle of light beams along an aiming line (5), which form an optical image of the viewed object, a reflecting member (12) provided to be hit by said bundle from the first part (4) and to reflect at least a primary part of the light of said bundle, and a second part (8), which includes an ocular member (9) enabling to the user to view the object along the aiming line (5), characterised in that the device includes an electronic image-receiving member (14), which is arranged to receive said reflected primary part and to convert it to an electric signal and which image-receiving member (14) is connectable to an electronic image-processing unit (15), which includes a memory member (17) arranged to store said electric signal in an electronic manner.
2. A device according to claim 1, characterised in that the device includes an aiming means (7), which has a point arranged to be located at said aiming line (5).
3. A device according to any one of the preceding claims, characterised in that the reflecting member (12) is semi-transparent for permitting a secondary part of the light of said bundle from the first part to extend through the reflecting member (12) further to the eye (6) of the user.
4. A device according to any one of the preceding claims, characterised in that the image-receiving member (14) includes a light sensible surface area facing the reflecting member (12).
5. A device according to any one of the preceding claims, characterised in that the image-receiving member (14) is provided outside said aiming line (5) and in connection to an inner wall portion of said second part (8) of the device.

6. A device according to any one of the preceding claims, characterised in that the image-receiving member (14) is provided to be releasably connected to the device.
- 5 7. A device according to any one of the preceding claims, characterised in that said electric signal is a video signal.
8. A device according to any one of the preceding claims, characterised in that the image-processing unit (15) is arranged to convert said electric signal to an electronic image.
10
9. A device according to claim 8, characterised in that the device includes a display member (16), which is connected to the image-processing unit (15) and arranged to visualise said electronic image.
15
10. A device according to claim 9, characterised in that the display member (16) is arranged to visualise in real time the electronic image representing the image of the viewed object and/or to permit afterwards replay of said electronic image.
20
11. A device according to any one of claims 9 and 10, characterised in that the image-processing unit (15) is arranged to store a plurality of electronic images sequentially in the memory member (17), and the display member (16) is arranged to permit replay of a image sequence of said stored images.
25
12. A device according to any one of claims 9-11, characterised in that the device includes a sensor member (25), which is arranged to sense the value of one or several parameters and to co-operate with the image-processing unit (15), which is arranged to provide the user, via the display member (16), with information regarding said parameters.
30
- 35 13. A device according to any one of the preceding claims, characterised in that the image-processing unit (15) is arranged to be an integrated part of the device.

14. A device according to any one of the preceding claims, characterised in that the display member (16) is mounted in the device.
- 5
15. A device according to any one claims 9-14, characterised in that the reflecting member (12) includes two reflecting surfaces (11, 13; 22, 32), a first surface (11; 22) of which is intended to reflect said bundle of light beams from the first part (4) to the image-receiving member (14) and a second surface (13; 32) of which is intended to reflect the electronic image visualised by the display member (16) to the eye (6) of the user.
- 10
16. A device according to claim 15, characterised in that the reflecting member (12) is adjustable into at least two positions (12a, 12b), wherein a first position (12a) permits the user to view the object directly along the aiming line (5) and a second position (12b) permits the user to view the object virtually along the aiming line (5) via the display member (16).
- 15
- 20
17. A device according to any one of the preceding claims, characterised in that the device includes a member (18) for initiating and/or terminating said storing.
- 25
18. A device according to claim 17, characterised in that said member (18) is arranged to enable automatic initiating and/or terminating of said storing.
- 30
19. A device according to any one of claims 17 and 18, characterised in that said member (18) is arranged to co-operate with a trigger (30) of a firing device (20), in such a way that an initiated change of position of said trigger (30) activates said storing prior to a firing.
- 35
20. A device according to any one of the preceding claims, characterised in that the device is a telescopic sight (1).

21. A device according to claim 20, characterised in that the device includes means (35) for mounting of the device to a weapon (20).
- 5 22. A device according to any one of the preceding claims, characterised in that the device is arranged to permit that the reflected primary part is transferred to the image-receiving member (14) at the same time as the user views the object along the aiming line (5) via the ocular member (9).
- 10 23. A weapon, characterised in that it includes a device according to any one of claims 1-22.
- 15 24. A weapon system including a weapon (20) with a trigger (3) for firing towards a target and a telescopic sight (1) for directing the weapon towards the target, characterised in that the weapon system includes a device arranged to receive and store in an electronic manner an image sequence, which a user sees in said telescopic sight (1) in connection with the firing, in order to enable evaluation of the aiming point of the weapon (20) in connection with the firing and which point of impact is obtained thereby.
- 20 25. A weapon system according to claim 24, characterised in that said device is arranged to co-operate with the weapon (20) and the telescopic sight (1) in such a way that an initiated change of position of the trigger (30) activates said storing prior to the firing.
- 25 26. Use of a device according to any one of claims 1-22 in order to direct a weapon towards a target.



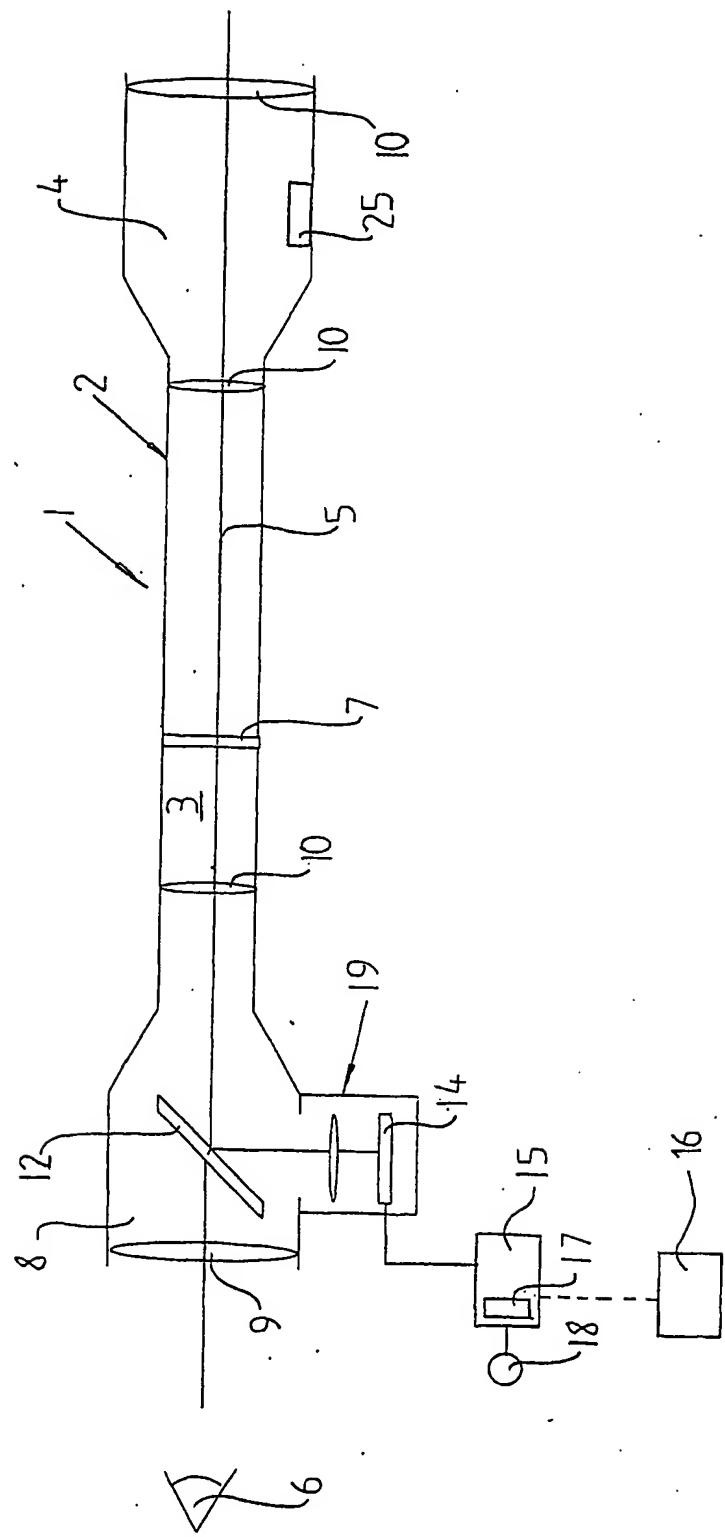


Fig 2

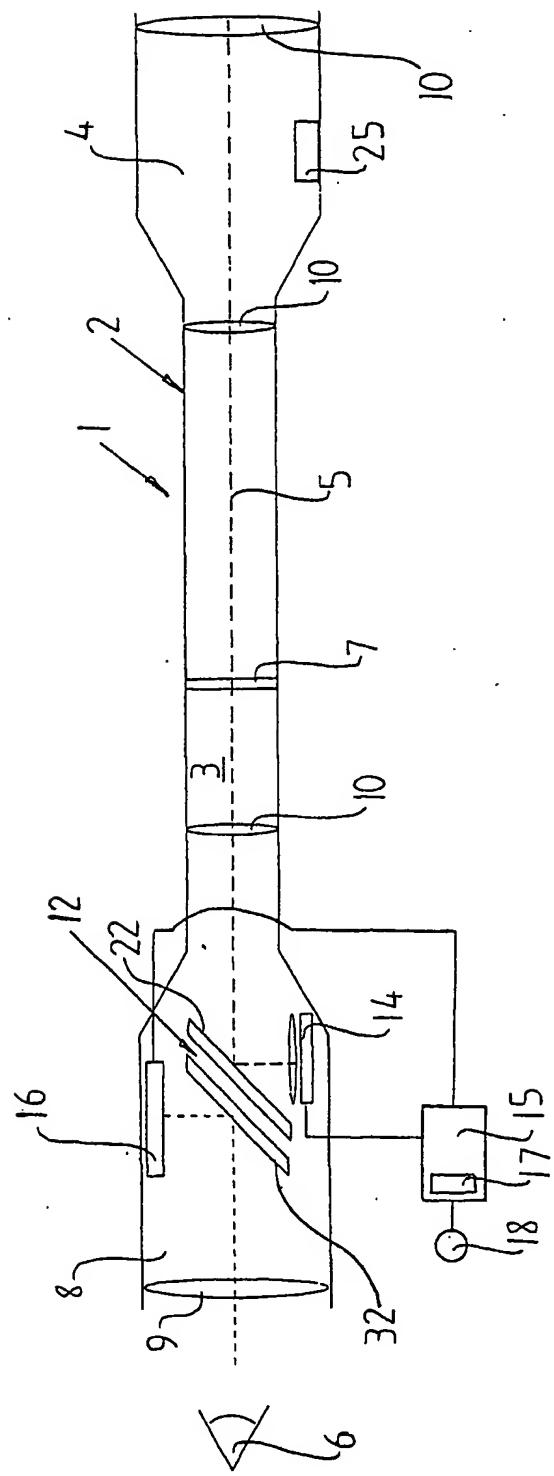


Fig 3

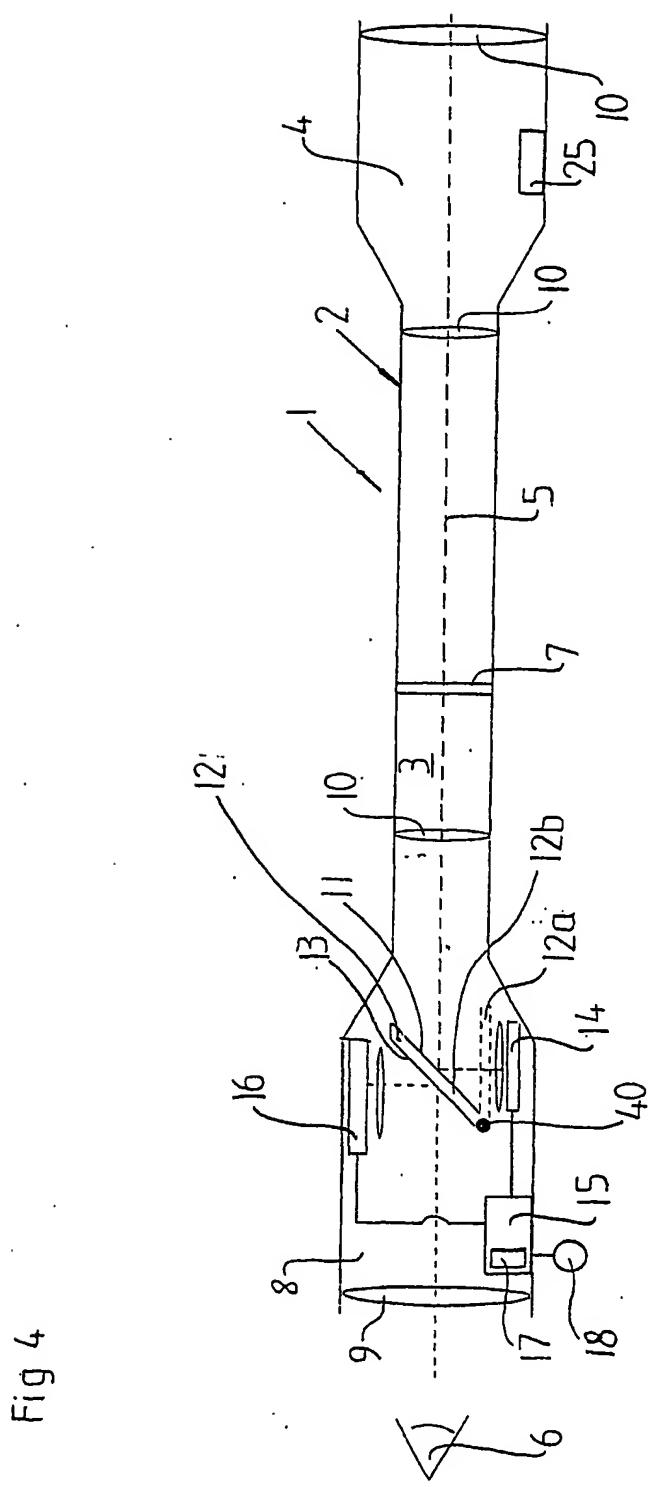


Fig 4

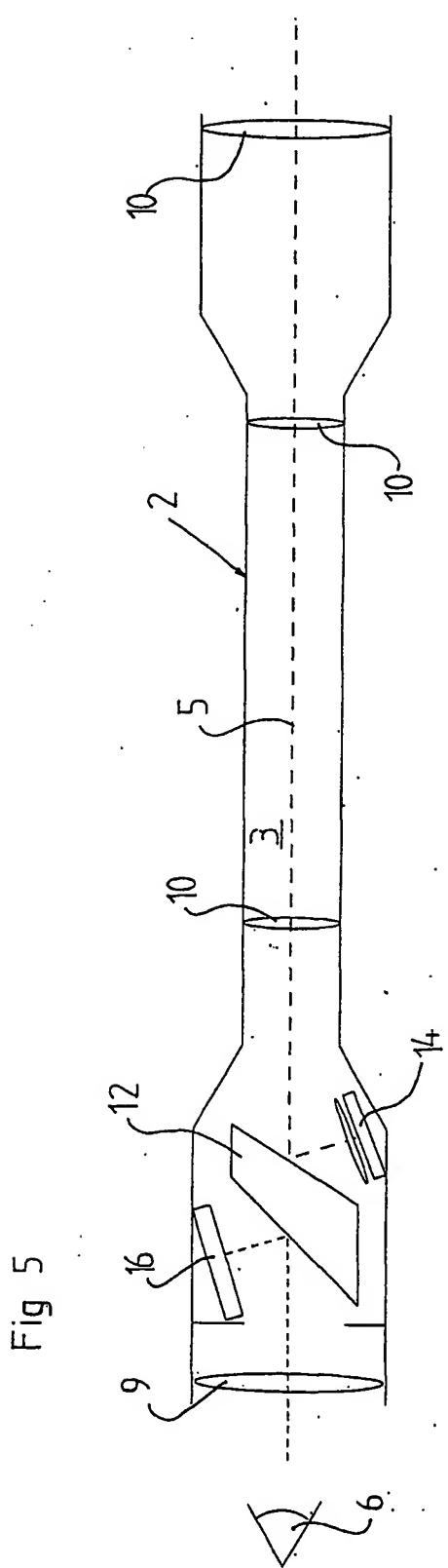


Fig 5

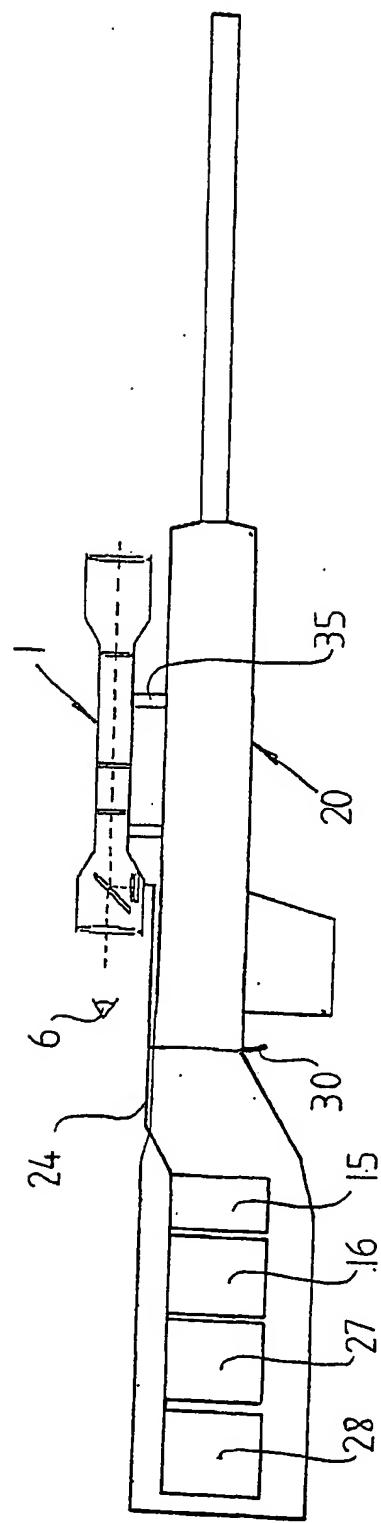


Fig 6

INTERNATIONAL SEARCH REPORT

1

International application No.

PCT/SE 01/02697

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G02B 23/04, F41G 1/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G02B, F41G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|-----------------------|
| X | GB 1418539 A (K. VOCKENHUBER), 24 December 1975 (24.12.75) | 1-14,17-26 |
| A | -- | 15-16 |
| A | DE 3545827 A1 (PRECITRONIC GESELLSCHAFT FÜR FEINMECHANIK UND ELECTRONIC MBH), 7 August 1986 (07.08.86) | 1-26 |
| A | EP 0787968 A1 (FN HERSTAL), 6 August 1997 (06.08.97) | 1-26 |
| | -- | |

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "B" earlier application or patent but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search

18 February 2002

Date of mailing of the international search report

04 -03- 2002

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile No. + 46 8 666 02 86Authorized officer

Linda Ödman / MRO
Telephone No. + 46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 01/02697

| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT | | |
|---|--|-----------------------|
| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
| A | US 3798796 A (E. STAUFF ET AL), 26 March 1974 (26.03.74) -- | 1-26 |
| A | US 4302191 A (J.L. WEIBULL), 24 November 1981 (24.11.81) -- | 1-26 |
| A | US 4835621 A (J.W. BLACK), 30 April 1989 (30.04.89) -- ----- | 1-26 |

INTERNATIONAL SEARCH REPORT
Information on patent family members

28/01/02

International application No.

PCT/SE 01/02697

| Patent document cited in search report | Publication date | | Patent family member(s) | Publication date |
|--|------------------|--|--|--|
| GB 1418539 A | 24/12/75 | | AT 322973 B CH 564755 A DE 2355020 A HK 53276 A JP 49096744 A US 3911451 A | 15/02/75 31/07/75 16/05/74 03/09/76 12/09/74 07/10/75 |
| DE 3545827 A1 | 07/08/86 | | DE 3545829 A DE 3545830 A,C DE 3545831 A,C US 4689016 A US 4695256 A US 4801201 A | 07/08/86 07/08/86 07/08/86 25/08/87 22/09/87 31/01/89 |
| EP 0787968 A1 | 06/08/97 | | AU 6697896 A BE 1010258 A CA 2196441 A DE 787968 T ES 2109213 T IL 120083 D | 05/03/97 07/04/98 01/08/97 26/03/98 16/01/98 00/00/00 |
| US 3798796 A | 26/03/74 | | DE 2231666 A,B,C GB 1372783 A | 17/01/74 06/11/74 |
| US 4302191 A | 24/11/81 | | AT 9514 T DE 3069200 D EP 0018332 A,B SE 428329 B,C SE 7902753 A | 15/10/84 00/00/00 29/10/80 20/06/83 29/09/80 |
| US 4835621 A | 30/04/89 | | CA 1290965 A | 22/10/91 |